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Research Note

USDA FOREST SERVICE INT-286
INTERMOUNTAIN FOREST & RANGE EXPERIMENT STATION
507-25th STREET, OGDEN, UTAH 84401

March 1980

ROUNDWOOD PRODUCT POTENTIAL IN LOGGING RESIDUE

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ABSTRACT

Logging residue in a small clearcut of mixed Douglas-fir and ponderosa pine was examined to determine if commercial products other than fuel could be salvaged prior to disposal by burning. About 112 stud logs, 195 fenceposts, and 41 fence rails valued at $534 could be salvaged from each acre. Products would be slightly lower in quality and more time consuming to salvage than to harvest by conventional means.

KEYWORDS: Postharvest residue, wood products, salvage

Forest land managers have long been concerned with the quantity and quality of the wood left on an area following the removal of the sawlogs. This residue, consisting of small unmerchantable trees, tree tops and branches, and dead, rotten, or cull trees is usually disposed of by burning, a time-consuming and costly process. Ideally, the residues would be utilized; however, uncertainty about salvable products and cost of removal have deterred the harvesting of residue.

Several field sampling and photo systems have been devised and used to estimate the quantity of post-harvest residue (Dell and Ward 1971; Maxwell and Ward 1976a, 1976b). Although the systems provide an estimate of the residue volume either in tons or cubic feet per acre, they do not evaluate the suitability of individual pieces for specific products.

As a part of a silvicultural-harvesting study, the roundwood product potential of the logging residue on a small clearcut area was determined. This research note reports the number and value of stud logs, fenceposts, and fence rails that could be recovered from the residue of a harvested mixed Douglas-fir-ponderosa pine (*Pseudotsuga menziesii-Pinus ponderosa*) stand.

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STUDY PROCEDURE

The study area was located on the University of Montana's Lubrecht Experimental Forest about 30 miles northeast of Missoula, Mont. The terrain was gently rolling, with slopes less than 10 percent and an aspect of west to northwest. The mature trees were Douglas-fir and ponderosa pine, and the understory had some western larch (*Larix occidentalis*) as well as the overstory species. The principal investigation on this area was concerned with the evaluation of environmental and economic consequences of different silvicultural cutting prescriptions and residue disposal alternatives.

A 4.95-acre (2.0 ha) clearcut that had been tractor skidded was selected for study. Prior to harvesting, the area had been cruised and the number and volume of the trees, by species and diameter, were estimated. During harvesting, all trees, regardless of size, were felled and no attempt was made to pile or rearrange the residue after the log skidding had been completed. At this time, too, a complete record was obtained of the diameters and lengths of all the logs removed from the area.

Following the completion of the fall harvesting, a complete inventory was made of the potential products obtainable from the postharvest residue. A two-man crew, an estimator and a recorder, was used to obtain the data. This crew made repeated traverses, back and forth across the area, measuring and identifying the pieces as either stud logs, fenceposts, or rails. The counted pieces as well as all the other material within the traversed area were marked with paint using a tree-marking gun.

Criteria for different products were as follows:

1. Stud logs - minimum diameter at small log end 5.5 inches (14 cm); minimum length 8 feet (2.4 m); at least 50 percent sound.

2. Fenceposts - minimum diameter at small end of piece 2.5 inches (6 cm); minimum length 6.5 feet (2 m); no decay or rot permitted.

3. Fence rails - minimum diameter at small end of piece 2 inches (5 cm); minimum length 10 feet (3 m); no decay or rot permitted.

An average value was assigned to each product category and a total value for the potential products determined.

RESULTS AND DISCUSSION

Results of the preharvest tree inventory are shown in table 1. Only two species, Douglas-fir and ponderosa pine, were represented in the cruised sample of merchantable trees. The same two species and western larch made up the unmerchantable sample. The preharvest volume of trees 5 inches (12.7 cm) or larger in diameter breast height are shown in table 2. Volume (per acre) of Douglas-fir was 2,601 cubic feet (182.0 m^3/ha) and of ponderosa pine 232 cubic feet (16.2 m^3/ha). The estimated total volume to be harvested was 14,023 cubic feet (981.2 m^3/ha).

Table 1.--*Distribution of trees per acre (per ha) by species and d.b.h. on an area to be clearcut*

Diameter (d.b.h.)		Tree species			Total trees
		Douglas-fir	Ponderosa pine	Western larch	
Inches	*Centimeters*	*No. trees per acre*			
<0.9	<2.3	2,492	-	23	2,515
1.0-2.9	2.5-7.4	323	46	-	369
3.0-4.9	7.6-12.4	230	-	-	230
Subtotal		3,045	46	23	3,114
		(7,521)	(114)	(57)	(7,692)
5.0-6.9	12.7-17.5	-	-	-	-
7.0-8.9	17.8-22.6	56	-	-	56
9.0-10.9	22.9-27.7	15	11	-	26
11.0-12.9	27.9-32.8	-	4	-	4
13.0-14.9	33.0-37.9	13	3	-	16
15.0-16.9	38.1-42.9	14	-	-	14
17.0-18.9	43.2-48.0	14	-	-	14
19.0-20.9	48.3-53.1	3	-	-	3
Subtotal		115	18	-	133
		(284)	(44)	-	(328)
Grand total		3,160	64	23	3,247
		(7,805)	(158)	(57)	(8,020)

Table 2.--*Preharvest volume of trees 5 inches (12.7 cm) and larger in diameter by species and diameter class*

Diameter class		Douglas-fir		Ponderosa pine		Total volume	
Inches	*Centimeters*	*Ft^3/acre*	*Ft^3/area*	*Ft^3/acre*	*Ft^3/area*	*Ft^3/acre*	*Ft^3/area*
5.0-8.9	12.7-22.6	298	1,475	-	-	298	1,475
9.0-14.9	22.9-37.9	532	2,633	232	1,148	764	3,782
15.0+	38.1+	1,771	8,766	-	-	1,771	8,766
Total		2,601 ($182\ m^3$/ha)	12,874	232 ($16\ m^3$/ha)	1,148	2,833 ($198\ m^3$/ha)	14,023

The record of material removed from the area showed that an average of 3,567 cubic feet (101.9 m^3) was taken from each acre and a total of 17,657 cubic feet (499.7 m^3) was removed from the area. These volumes, per acre and total, exceeded the preharvest estimates. The sampling system and the use of inexperienced cruising personnel are possible reasons for this data discrepancy. Also, the cruise estimate was based on diameter breast high, whereas the volume removed was determined from outside bark measurements on log ends.

The postharvest inventory of the potential products left on the study is as follows:

Product	Per acre	Total area
Stud logs	112	552
Posts	195	963
Rails	41	201

The data in the above tabulation must be considered as the greatest possible number of potential products with complete disregard for the species, quality, and production economics. Although the species in this stand are frequently used for stud logs, rarely are they used for posts and fence rails. The quality of many of these products would be inferior to that of products obtained from smaller trees. Stud logs and posts cut from tree tops would have more knots, more taper, and would cost more to produce than these same products made from the clear stems of smaller trees.

Based on early 1979 market conditions, average delivered mill values were determined for the different products. Products and values were:

Product	Value
Stud logs, M bd.ft.	$160.00
Post, each	.40
Fence rails, each	.25

Assuming 20 logs per cord and two cords per M board feet, the value of the stud logs was $2,208.00. The value of the posts was $385.20 and the rails $50.25. The total value of all products from the area's postlogging residue was then $2,643.45 or $534 per acre. In addition, some fuel wood could be obtained from the defective pieces of wood not suitable for products. These approximations indicate that the potential products obtained from the postharvest residue possess considerable value. The time and cost of producing these products are probably the principal deterrents to their utilization.

SUMMARY AND CONCLUSIONS

An inventory of stud logs, fenceposts, and fence rails on a clearcut area in a mixed Douglas-fir ponderosa pine stand indicated that a considerable number of these products might be obtained from the postharvest residue. A total of 552 stud logs, 963 fenceposts, and 201 fence rails were identified on the 4.95 acre (2 ha) area. Under current market conditions (early 1979) these products have an approximate total value of $2,643.45 or $534 per acre.

The time and cost of salvaging these products from the residue are the probable reasons more of these products are not utilized. In addition, the products are usually of lower quality than the same products made from smaller trees.

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☆ U.S. GOVERNMENT PRINTING OFFICE: 1979-0-677-121/109

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